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EXAMINER

HAN, KWANG S

ART UNIT	PAPER NUMBER
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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/810,080	Applicant(s) OH ET AL.	
	Examiner Kwang Han	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/6/2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-73 is/are pending in the application.
- 4a) Of the above claim(s) 2,5-7,12,15-17,19,22,23,35-41 and 44-72 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,8-11,13,14,18,20,21,24-34,42,43 and 73 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>4/9/04, 4/23/04, and 5/19/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of species group A in the reply filed on 5/6/2008 is acknowledged. The traversal is on the ground(s) that the species of formulas I-a through I-d as shown in claim 10 are not mutually exclusive. This is not found persuasive because the formulas as shown are distinct from each other. Formula I-a shows a required polyether group, Formula I-b shows two required polyether groups, Formula I-c shows a cyclic polysiloxane with a required polyether group, and Formula I-d shows a required polyether and a cyclic carbonate group. These are all mutually exclusive structures.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 2, 5-7, 12, 15-17, 19, 22-23, 35-41, and 44-72 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse for species groups B, C, and the election of an invention in the reply filed on 5/6/2008.

Claim Objections

3. Claims 36-41 are objected to because they contain incorrect claim status identifiers which state the claims as "previously presented" when they should be "withdrawn". Applicant withdrew claim 35 of which claims 36-41 depend upon. Correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 14 and 73 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The original disclosure does not disclose that the R₄₀ is an organic spacer including an oxygen linked directly to silicon on the backbone of the polysiloxane.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In formula I-d it states "R₃₈ is nil an oxygen or an organic spacer" which is unclear. For claims analysis purposes it will be taken as "R₃₈ is nil, an oxygen or an organic spacer".

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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8. Claims 1, 8, 9, 20, 21, 26, 28, 29, 34, 42, and 43 are rejected under 35 U.S.C. 102(b) as being anticipated by Spiegel et al. (US 6447952, as cited in IDS).

Regarding claim 1, Spiegel discloses an electrolyte for an electrochemical device comprised of:

- one or more polysiloxanes [Abstract],
- one or more alkali metal salts (Column 4, Lines 53-54), and
- one or more silanes (Column 4, Line 55).

Regarding claims 8, 9, 20, and 21, Spiegel discloses silanes carrying alkoxy groups (Column 4, Lines 54-55).

Regarding claim 26, Spiegel discloses a salt which is a lithium salt (Column 2, Line 61).

Regarding claim 28, Spiegel discloses a salt comprised of LiClO_4 (Column 5, Line 34).

Regarding claim 29, Spiegel discloses the electrolyte further including vinyl carbonate (Column 7, Lines 65-68).

Regarding claim 34, Spiegel discloses an electrolyte that that comprises liquid polymers (Column 16, Line 32).

Regarding claim 42, Spiegel discloses an electrolyte that has an ionic conductivity greater than 1.0×10^{-4} S/cm at 25°C (Figure 4A, p1801).

Regarding claim 43, Spiegel discloses an electrolyte that has an ionic conductivity greater than 1.0×10^{-4} S/cm at 25°C (Figure 4B, both).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegel et al. as applied to claim 1 above and further in view of Kang et al. (US 6783897).

Regarding claims 3 and 4, the teachings of Spiegel as discussed above are herein incorporated. Spiegel discloses a polysiloxane that includes a carbonate moiety [Abstract] but is silent towards including a poly(alkylene oxide) moiety.

Kang et al. teaches a polysiloxane polymer that includes a polyalkylene oxide group to allow for crosslinking and use in a lithium-polymer secondary battery for improving ionic conductivity. [Abstract] (Column 3, Line 1 – Column 4, Line 5).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Kang's polyakylene oxide group in the polysiloxane of Spiegel for the benefit of providing a battery electrolyte which can be cross-linked so the electrolyte can be formed into a film and improve ionic conductivity.

12. Claims 10, 11, 13, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegel et al. as applied to claim 1 above, and further in view of Okada (US 2002/0051911).

Regarding claims 10, 11, 13, and 18 the teachings of Spiegel as discussed above are herein incorporated. Spiegel discloses the cyclic carbonate group (Column 3, Lines 50-62) where q is 1 or 2 as shown in Formula I-d of the claim.

Okada teaches a polymer electrolyte for use in a battery comprised of a polysiloxane with a polyethylene oxide and a cyclic carbonate group [0047] where m is 0, q is 1 [0026, 0031], R₃₆, R₃₉ is an alkyl group [0026], R₃₈ is an organic spacer [0031], R₄₀ is an organic spacer [0026], R₄₁ is a hydrogen [0026], R₄₂ is an alkyl group [0026], Z is an alkyl group [0026, 0031], n and p not less than 1 [0027, 0032], and r is an integer of 1 to 12 to form a polymer electrolyte showing a high level of ionic conductivity and excellent mechanical strength [Abstract].

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Okada's polysiloxane with the polyethylene oxide group and cyclic carbonate group in Spiegel's electrolyte for the benefit of providing a polymer composition that allows for a high level of ionic conductivity and excellent mechanical strength.

Alternatively, simple substitutions of one known group for another obtain predictable results would have been obvious to one having ordinary skill in the art. See *KSR v. Teleflex*, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007).

13. Claims 14 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegel et al. and Okada as applied to claims 10 and 18 above, and further in view of Amine et al. (US 2004/0197665).

Regarding claims 14 and 73, the teachings of Spiegel et al. and Okada as discussed above are herein incorporated. Both Spiegel et al. and Okada are silent towards an oxygen linked directly to the silicon on the backbone of the polysiloxane.

Amine teaches a polysiloxane with a poly (alkylene oxide) oxide group that is connected to the polysiloxane with an oxygen linked directly to the silicon backbone [0016 - 0018] for the benefit of providing a polymer with thermal stability and nontoxicity.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Amine's oxygen linked group to the silicon backbone of the polysiloxane in Spiegel and Okada's electrolyte for the benefit of providing thermal stability and nontoxicity to the electrolyte.

14. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegel et al. as applied to claim 20 above, and further in view of Chaloner-Gill (US 5294501).

Regarding claim 24, the teachings of Spiegel as discussed above is herein incorporated.

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Chaloner-Gill teaches the use of an alkylene organic spacer within a silane used to form an electrolyte (Column 2, Line 57 - Column 3, Line 7) for the benefit of facilitating the positioning of the inorganic ion salt and solvent during use.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Chaloner-Gill's alkylene organic spacer in Spiegel's siloxane for the benefit of facilitating positioning of the ion salts and solvent during use.

15. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegel and Chaloner-Gill as applied to claim 24 above, and further in view of Batzold (US 3351494).

The teachings of Spiegel and Chaloner-Gill as discussed above are herein incorporated. Both Spiegel and Chaloner-Gill are silent towards the use of a silane with a halogenated group.

Batzold teaches the use of a halogenated alkyl silane as a wetproofing agent in electrochemical cells (Column 2, Lines 14-18) for electrodes.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Batzold's halogenated alkyl silane in Spiegel and Chaloner-Gill's electrolyte for the benefit of providing waterproofing to the electrodes.

16. Claim 27, 30, 31, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegel et al. as applied to claim 1 above and further in view of Jow et al. (US 7172834)

Regarding claim 27, the teachings of Spiegel as discussed above are herein incorporated. Spiegel discloses ratios for the amount of alkali metal salts depending upon the amount of cyclic carbonate groups present (Column 5, Lines 33-42) but is silent towards a specific ratio range.

Jow et al. teaches electrolyte salts for a lithium battery in the range of 0.3 to 1.5 moles per liter (Column 5, Lines 44-45) to provide sufficient ion conduction.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Jow's electrolyte salt concentration in Spiegel's electrolyte for the benefit of providing sufficient ion conduction.

It has been held that prior art which teaches a range overlapping or touching the claimed range anticipates if the prior art range discloses the claimed range with "sufficient specificity" (MPEP 2131.03).

Regarding claim 30, the teachings of Spiegel as discussed above are herein incorporated. Spiegel is silent towards the use of lithium(oxalato)borate (LiBOB) salt as an additive to the electrolyte.

Jow teaches an electrolyte which includes LiBOB salt (Column 5, Line 50) and vinyl carbonate (VC) to promote the formation of a protective layer on the anode (Column 6, Lines 10-13).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use Jow's additive materials in Spiegel's electrolyte for the benefit of promoting the formation of a protective layer on the anode.

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Regarding claim 31, the teachings of Spiegel and Jow as discussed above are herein incorporated. Spiegel teaches a battery comprised of a first electrode, second electrode, and a separator comprising an alkali ion porous polymer (Claim 15) but is silent towards a carbon or lithium anode.

Jow teaches a secondary battery (Column 1, Line 20) comprised of a lithium metal oxide cathode (Column 1, Lines 30-33), and a carbon anode (Column 1, Lines 37-40) to form a high voltage and high energy rechargeable battery.

It would have been obvious to one of ordinary skill at the time of the invention to apply Jow's secondary battery components in combination with Spiegel's electrolyte for the benefit of forming a high voltage and high energy rechargeable battery.

Regarding claim 32, the teachings of Spiegel and Jow as discussed above are herein incorporated.

Jow further teaches the materials for the cathode to be LiCoO_2 , LiNiO_2 , and LiMn_2O_4 (Column 1, Line 32).

Regarding claim 33, Jow further teaches the anode to be comprised of various forms of carbon and graphite (Column 4, Lines 60-63).

Contact/Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang Han whose telephone number is (571) 270-5264. The examiner can normally be reached on Monday through Friday 8:00am to 5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on (571) 272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. H./

Examiner, Art Unit 1795

/Susy Tsang-Foster/

Supervisory Patent Examiner, Art Unit 1795